

# OPTICALLY FAINT COUNTERPARTS TO THE ISO-FIRBACK 170 $\mu$ m POPULATION: THE DISCOVERY OF COLD, LUMINOUS GALAXIES AT HIGH REDSHIFT

Scott Chapman and G. Helou  
California Institute of Technology, 1200 E. California Blvd., Pasadena, CA 91125

## ABSTRACT

We present Keck spectroscopy and near-IR imaging observations of two 170  $\mu$ m sources from the ISO-FIRBACK survey which have faint counterparts in the optical, and  $r-K \sim 5$ . Both sources were expected to lie at  $z > 1$  based on their far-infrared, submillimeter and radio fluxes, assuming a similar spectral energy distribution to the local ultra-luminous infrared galaxy (ULIRG) Arp220. However, our spectroscopy indicates that the redshifts of these galaxies are  $z < 1$ . While the bolometric luminosities of both galaxies are similar to Arp220, it appears that the dust emission in these systems has a characteristic temperature of  $\sim 30$ K, much cooler than the 50K seen in Arp220. If these galaxies are characteristic of the optically faint FIRBACK population, then evolutionary models of the far-infrared background must include a substantial population of cold, luminous galaxies.

*Editor's note: The manuscript of this presentation is not available for the proceedings.*

*Contact information for S. Chapman: Email: [schapman@iraastro.caltech.edu](mailto:schapman@iraastro.caltech.edu)*